

October 6, 2009

Chairman Mary Nichols
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: "Proposed Regulation to Implement the LCFS"
(Staff Report, Volume I, March 5, 2005) (the "Report")

Cobalt Technologies, Inc., based in Mountain View, California, is a private company that is leading the commercialization of biobutanol. We commend the Air Resources Board for adopting the Low Carbon Fuel Standard last April and taking on the many challenging issues surrounding the goal of reducing the carbon emissions of liquid transportation fuels.

Cobalt has developed innovative technology for the production of biobutanol from non-food, lignocellulosic material. Our process reduces lifecycle greenhouse gas emissions by more than 85% compared to gasoline. Our facilities combine low-cost feedstock pretreatment, a novel bioreactor design for high productivity fermentation and a high degree of energy integration, which, taken together, produce biobutanol at a cost that would be profitable at today's oil prices.

Our process is based on the use of non-food feedstock, initially woody biomass (consisting principally of thinning, mill residues and sustainable roundwood), to be followed by agricultural residue and dedicated low-input, high biomass energy crops. An important differentiating attribute of Cobalt's process is the ability of *Clostridium* to convert both hemicellulose-derived sugars and cellulose-derived sugars, while most ethanol fermentations are limited to conversion of monomeric glucose derived from hydrolysed cellulose. In addition, the lignin portion of the biomass is burned to provide energy for the production process, with excess renewable electricity exported to the grid.

Biobutanol is a high quality fuel and fuel blending component. As noted in the Report, biobutanol can be blended with both gasoline and ethanol. In addition, the Report notes that biobutanol has "a number of advantages over ethanol," including higher energy density, less corrosivity, less volatility, compatibility with the pipeline distribution system and the ability to be mixed in more flexible proportions.

The Report asserts that "the technology [for producing biobutanol] will not be fully commercialized until sometime after 2020." We believe that we are on track to produce commercial quantities of butanol by 2015 – in other words, on the same timetable, if not

sooner, than the large scale commercialization of cellulosic ethanol.¹ We are currently in the process of scaling up our technology. We operate a pilot-scale fermentation system in Mountain View and a pilot pretreatment facility in Colorado. We are planning to build an integrated pilot facility during 2010 and complete our first commercial-scale plant in 2013. We are currently selecting sites for this plant, and among the most attractive candidates are sites in several counties in northern California with high availability of woody biomass (specifics have been omitted for trade secret purposes). Once this facility is operational, our ability to develop multiple commercial-scale facilities simultaneously, and to license the technology to independent project developers, would be limited only by the availability of capital.

We understand that prior to selling biobutanol blends in California a multimedia evaluation will be required, which can be both expensive and time-consuming. It is our understanding that another potential producer of biobutanol has already initiated such an evaluation, and as test quantities of our biobutanol become available we would expect to work closely with ARB (and, to the extent feasible, with other producers) to ensure that all applicable requirements are met.

In addition, we understand that to be officially accorded a carbon-footprint reduction for the LCFS, Cobalt's fuel will be subjected to the California-Modified GREET Pathway for Transportation Fuels. We have completed our own life cycle analysis, based on GREET but supplemented by specific analysis of our process where GREET data are lacking or inapplicable, and would be pleased to share this analysis with the ARB staff. We are aware of the Argonne National Lab corn-to-butanol GREET analysis; however, the differences conferred by the two processes indicated to us that we should generate our own pathway model.

We also understand that one of the most challenging components in developing fuel pathways is the assessment of indirect land use changes (ILUC), particularly in relation to the use of food-based feedstock. One of the advantages of using locally-sourced woody biomass as a feedstock is that ILUC are only a minor factor under almost any methodology. We are well aware of the controversy surrounding the methodology for calculating ILUC and agree with the ARB's approach of establishing an Expert Workgroup to assist the Board in refining and improving the methodology for analyzing land use and indirect effects from the production of transportation fuels.

We look forward to engaging with ARB staff as we move toward the development of a fuel pathway for biobutanol from lignocellulosic feedstocks. We are confident that Cobalt's proprietary technologies will make possible a new generation of cost-effective

¹ The Report also states that "staff is not aware of any facility producing biobutanol on a commercial basis." While this is true in the United States, commercial facilities for the production of biobutanol, based on the ABE fermentation method, from foodstocks, are in intermittent operation in Russia and China, depending on market prices.

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and domestically-produced biofuels that will play a significant role in achieving the Low Carbon Fuel Standard and help maintain California as the hub of green technology innovation.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick Wilson". The signature is fluid and cursive, with the first name "Rick" and last name "Wilson" clearly distinguishable.

Rick Wilson
Chief Executive Officer